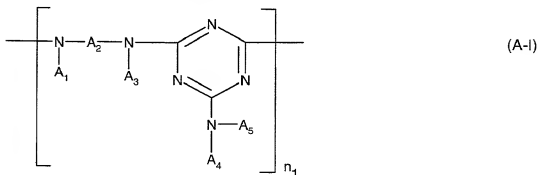


# Claims

## 1. A composition containing

polypropylene prepared by polymerization over a metallocene catalyst or a polypropylene copolymer prepared by polymerization over a metallocene catalyst, and a stabilizer mixture comprising

(A) a compound of the formula (A-I) or a product (A-II) or a compound of the formula (A-III);



wherein

A<sub>1</sub>, A<sub>3</sub>, A<sub>4</sub> and A<sub>5</sub> independently of one another are hydrogen, C<sub>1</sub>-C<sub>12</sub>alkyl, C<sub>5</sub>-C<sub>12</sub>cycloalkyl, C<sub>1</sub>-C<sub>4</sub>alkyl-substituted C<sub>5</sub>-C<sub>12</sub>cycloalkyl, phenyl, -OH- and/or C<sub>1</sub>-C<sub>10</sub>alkyl-substituted phenyl, C<sub>7</sub>-C<sub>9</sub>phenylalkyl, C<sub>7</sub>-C<sub>9</sub>phenylalkyl which is substituted on the phenyl radical by -OH and/or C<sub>1</sub>-C<sub>10</sub>alkyl; or a group of the formula (a-1),



with A<sub>6</sub> being hydrogen, C<sub>1</sub>-C<sub>8</sub>alkyl, O<sup>-</sup>, -OH, -CH<sub>2</sub>CN, C<sub>1</sub>-C<sub>18</sub>alkoxy, C<sub>5</sub>-C<sub>12</sub>cycloalkoxy, C<sub>3</sub>-C<sub>8</sub>alkenyl, C<sub>7</sub>-C<sub>9</sub>phenylalkyl unsubstituted or substituted on the phenyl by 1, 2 or 3 C<sub>1</sub>-C<sub>4</sub>alkyl; or C<sub>1</sub>-C<sub>9</sub>acyl,

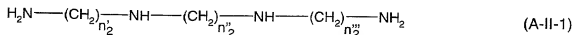
A<sub>2</sub> is C<sub>2</sub>-C<sub>18</sub>alkylene, C<sub>5</sub>-C<sub>7</sub>cycloalkylene or C<sub>1</sub>-C<sub>4</sub>alkylenedi(C<sub>5</sub>-C<sub>7</sub>cycloalkylene), or the radicals A<sub>1</sub>, A<sub>2</sub> and A<sub>3</sub>, together with the nitrogen atoms to which they are attached, form a 5- to 10-membered heterocyclic ring, or

A<sub>4</sub> and A<sub>5</sub>, together with the nitrogen atom to which they are attached, form a 5- to 10-membered heterocyclic ring,

n<sub>1</sub> is a number from 2 to 50, and

at least one of the radicals A<sub>1</sub>, A<sub>3</sub>, A<sub>4</sub> and A<sub>5</sub> is a group of the formula (a-1);

a product (A-II) obtainable by reacting a product, obtained by reaction of a polyamine of the formula (A-II-1) with cyanuric chloride, with a compound of the formula (A-II-2)

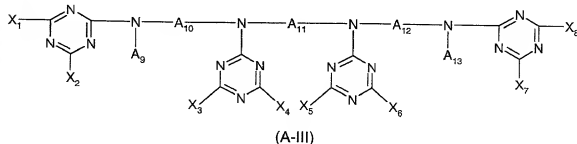


in which

$n'_2$ ,  $n''_2$  and  $n'''_2$  independently of one another are a number from 2 to 12,

$\text{A}_7$  is hydrogen,  $\text{C}_1\text{-C}_{12}$ alkyl,  $\text{C}_5\text{-C}_{12}$ cycloalkyl, phenyl or  $\text{C}_7\text{-C}_9$ phenylalkyl, and

$\text{A}_8$  has one of the meanings of  $\text{A}_6$ ;



wherein

$\text{A}_9$  and  $\text{A}_{13}$  independently of one another are hydrogen or  $\text{C}_1\text{-C}_{12}$ alkyl,

$\text{A}_{10}$ ,  $\text{A}_{11}$  and  $\text{A}_{12}$  independently of one another are  $\text{C}_2\text{-C}_{10}$ alkylene, and

$\text{X}_1$ ,  $\text{X}_2$ ,  $\text{X}_3$ ,  $\text{X}_4$ ,  $\text{X}_5$ ,  $\text{X}_6$ ,  $\text{X}_7$  and  $\text{X}_8$  independently of one another are a group of the formula (V),



in which  $\text{A}_{14}$  is hydrogen,  $\text{C}_1\text{-C}_{12}$ alkyl,  $\text{C}_5\text{-C}_{12}$ cycloalkyl,  $\text{C}_1\text{-C}_4$ alkyl-substituted

$\text{C}_5\text{-C}_{12}$ cycloalkyl, phenyl,  $-\text{OH}$ - and/or  $\text{C}_1\text{-C}_{10}$ alkyl-substituted phenyl,  $\text{C}_7\text{-C}_9$ phenylalkyl,

$\text{C}_7\text{-C}_9$ phenylalkyl which is substituted on the phenyl radical by  $-\text{OH}$  and/or  $\text{C}_1\text{-C}_{10}$ alkyl; or a

group of the formula (a-1) as defined above, and

A<sub>15</sub> has one of the meanings of A<sub>6</sub>;

and

(B) a compound of the formula (B-I), (B-II) or (B-III);



in which

E<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>8</sub>alkyl, -O<sup>-</sup>, -OH, -CH<sub>2</sub>CN, C<sub>1</sub>-C<sub>18</sub>alkoxy, C<sub>1</sub>-C<sub>18</sub>alkoxy substituted by -OH; C<sub>5</sub>-C<sub>12</sub>cycloalkoxy, C<sub>3</sub>-C<sub>6</sub>alkenyl, C<sub>7</sub>-C<sub>9</sub>phenylalkyl unsubstituted or substituted on the phenyl by 1, 2 or 3 C<sub>1</sub>-C<sub>4</sub>alkyl; or C<sub>1</sub>-C<sub>8</sub>acyl,

m<sub>1</sub> is 1, 2 or 4,

if m<sub>1</sub> is 1, E<sub>2</sub> is C<sub>1</sub>-C<sub>25</sub>alkyl,

if m<sub>1</sub> is 2, E<sub>2</sub> is C<sub>1</sub>-C<sub>14</sub>alkylene or a group of the formula (b-1)



wherein E<sub>3</sub> is C<sub>1</sub>-C<sub>10</sub>alkyl or C<sub>2</sub>-C<sub>10</sub>alkenyl, E<sub>4</sub> is C<sub>1</sub>-C<sub>10</sub>alkylene, and E<sub>5</sub> and E<sub>6</sub> independently of one another are C<sub>1</sub>-C<sub>4</sub>alkyl, cyclohexyl or methylcyclohexyl, and

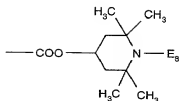
if m<sub>1</sub> is 4, E<sub>2</sub> is C<sub>4</sub>-C<sub>10</sub>alkanetetrayl;



in which

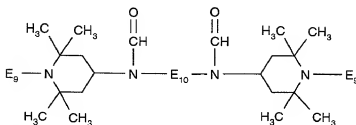
two of the radicals E<sub>7</sub> are -COO-(C<sub>1</sub>-C<sub>20</sub>alkyl), and

two of the radicals E<sub>7</sub> are a group of the formula (b-2)



(b-2)

with  $E_8$  having one of the meanings of  $E_1$ ;



(B-III)

wherein

the radicals  $E_9$  independently of one another have one of the meanings of  $E_1$ , and  $E_{10}$  is  $C_2$ - $C_{22}$ alkylene,  $C_5$ - $C_7$ cycloalkylene,  $C_1$ - $C_4$ alkylenedi( $C_5$ - $C_7$ cycloalkylene), phenylene or phenylenedi( $C_1$ - $C_4$ alkylene).

## 2. A composition according to claim 1 wherein

$A_1$ ,  $A_3$ ,  $A_4$  and  $A_5$  independently of one another are hydrogen,  $C_1$ - $C_8$ alkyl,  $C_5$ - $C_8$ cycloalkyl, methyl-substituted  $C_5$ - $C_8$ cycloalkyl, phenyl,  $C_7$ - $C_9$ phenylalkyl or a group of the formula (II), or the radicals  $A_4$  and  $A_5$ , together with the nitrogen atom to which they are attached, form a 6-membered heterocyclic ring,

$A_2$  is  $C_2$ - $C_{10}$ alkylene, and

$n_1$  is a number from 2 to 25;

$n'_2$ ,  $n''_2$  and  $n'''_2$  independently of one another are a number from 2 to 4, and

$A_7$  is hydrogen,  $C_1$ - $C_4$ alkyl,  $C_5$ - $C_8$ cycloalkyl, phenyl or benzyl;

$m_1$  is 1, 2 or 4,

if  $m_1$  is 1,  $E_2$  is  $C_{12}$ - $C_{20}$ alkyl,

if  $m_1$  is 2,  $E_2$  is  $C_2$ - $C_{10}$ alkylene or a group of the formula (b-1),

$E_3$  is  $C_1$ - $C_4$ alkyl,

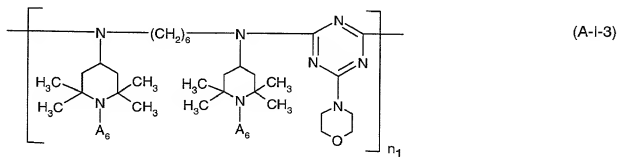
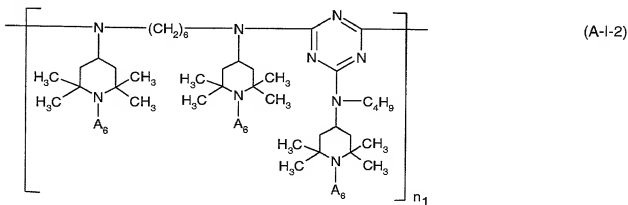
$E_4$  is  $C_1$ - $C_6$ alkylene, and

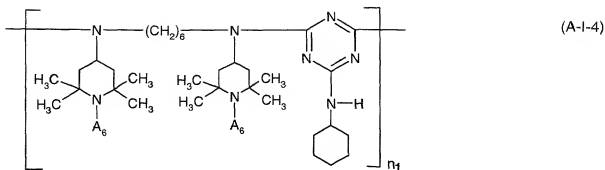
$E_5$  and  $E_6$  independently of one another are  $C_1$ - $C_4$ alkyl, and

if  $m_1$  is 4,  $E_2$  is  $C_4$ - $C_8$ alkanetetrayl;

3. A composition according to claim 1 wherein A<sub>6</sub>, A<sub>8</sub>, E<sub>11</sub>, E<sub>8</sub> and E<sub>9</sub> are hydrogen, C<sub>1</sub>-C<sub>4</sub>alkyl or C<sub>1</sub>-C<sub>8</sub>alkoxy.

4. A composition according to claim 1 wherein component (A) is a compound of the formula (A-I-1), (A-I-2), (A-I-3) or (A-I-4), or a product (A-II-a) or a compound of the formula (A-III-1);



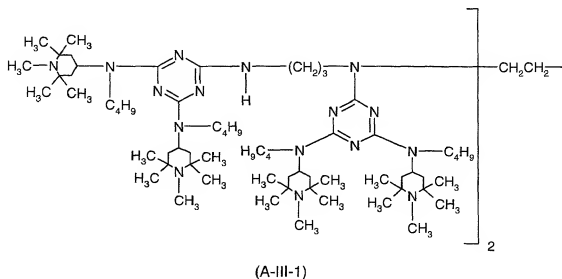


wherein  $\text{A}_6$  is hydrogen,  $\text{C}_1$ - $\text{C}_4$ alkyl or  $\text{C}_1$ - $\text{C}_8$ alkoxy and  $n_1$  is a number from 2 to 25;

a product (A-II-a) obtainable by reacting a product, obtained by reaction of a polyamine of the formula (A-II-1-a) with cyanuric chloride, with a compound of the formula (A-II-2-a)

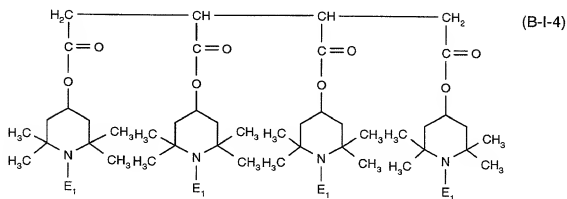
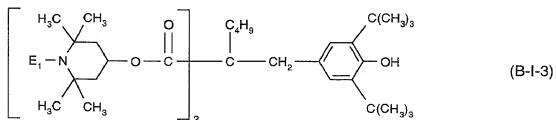
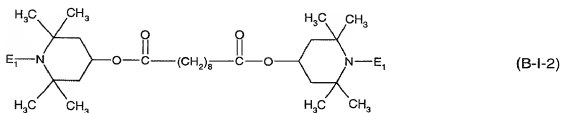


wherein  $\text{A}_6$  is hydrogen  $\text{C}_1$ - $\text{C}_4$ alkyl or  $\text{C}_1$ - $\text{C}_8$ alkoxy;



and

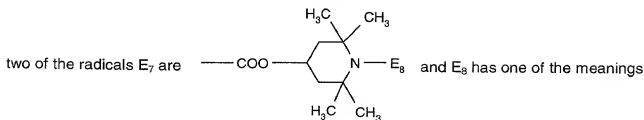
component B) is a compound of the formula (B-I-1), (B-I-2), (B-I-3), (B-I-4), (B-II-1) or (B-III-1);



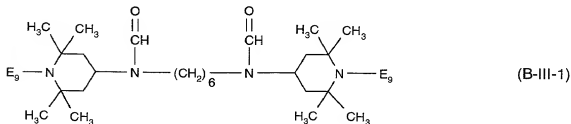
wherein E<sub>1</sub> is hydrogen, C<sub>1</sub>-C<sub>4</sub>alkyl, C<sub>1</sub>-C<sub>4</sub>alkoxy or C<sub>1</sub>-C<sub>4</sub>alkoxy substituted by -OH;



in which two of the radicals  $\text{E}_7$  are  $-\text{COO}-\text{C}_{13}\text{H}_{27}$  and



of  $\text{E}_1$ ;



wherein  $\text{E}_9$  has one of the meanings of  $\text{E}_1$ .

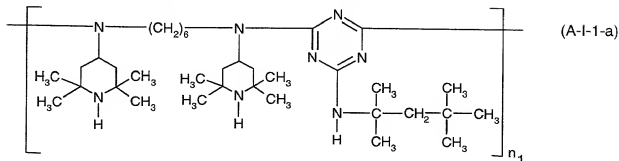
# 5. A composition according to claim 1 wherein

component (A) is a compound of the formula (A-I-1) and component (B) is a compound of the formula (B-I-1), (B-I-2), (B-I-3), (B-I-4), (B-II-1) or (B-III-1); or  
 component (A) is a compound of the formula (A-I-2) and component (B) is a compound of the formula (B-I-1), (B-I-2), (B-I-3), (B-I-4), (B-II-1) or (B-III-1); or  
 component (A) is a compound of the formula (A-I-3) and component (B) is a compound of the formula (B-I-1), (B-I-2), (B-I-3), (B-I-4), (B-II-1) or (B-III-1); or  
 component (A) is a compound of the formula (A-I-4) and component (B) is a compound of the formula (B-I-1), (B-I-2), (B-I-3), (B-I-4), (B-II-1) or (B-III-1); or  
 component (A) is a product (A-II-a) and component (B) is a compound of the formula (B-I-1), (B-I-2), (B-I-3), (B-I-4), (B-II-1) or (B-III-1); or  
 component (A) is a compound of the formula (A-III-1) and component (B) is a compound of the formula (B-I-1), (B-I-2), (B-I-3), (B-I-4), (B-II-1) or (B-III-1).



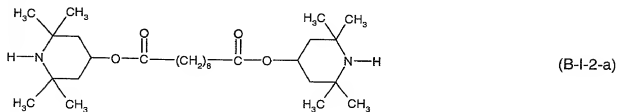
6. A composition according to claim 1 wherein

component (A) corresponds to the compound of the formula (A-I-1-a)



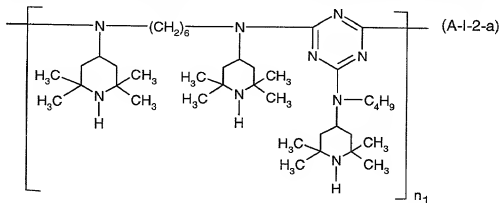
wherein  $n_1$  is a number from 2 to 20; and

component (B) corresponds to the compound of the formula (B-I-2-a).

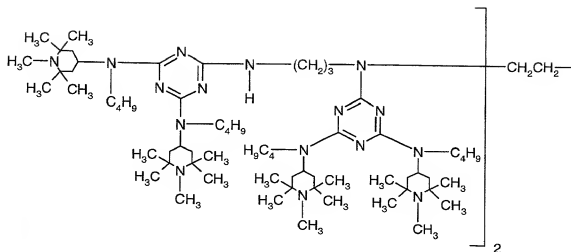


7. A composition according to claim 1 wherein

component (A) corresponds to the compound of the formula (A-I-2-a) or (A-III-1)



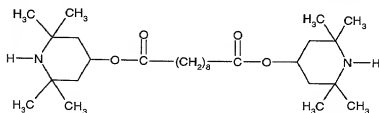
wherein  $n_1$  is a number from 2 to 20;



(A-III-1)

and

component (B) corresponds to the compound of the formula (B-I-2-a).



(B-I-2-a)

8. A stabilizer mixture according to claim 1, which additionally contains as a further component

(X-1) a pigment or

(X-2) an UV absorber or

(X-3) a pigment and an UV absorber.

9. A stabilizer mixture according to claim 1, which additionally contains as a further component

(XX) an organic salt of Ca, an inorganic salt of Ca, Ca oxide or Ca hydroxide.

10. A stabilizer mixture according to claim 1, which additionally contains as a further component

(XXX) at least an organic salt of Zn, an inorganic salt of Zn, Zn oxide, Zn hydroxide, an organic salt of Mg, an inorganic salt of Mg, Mg oxide or Mg hydroxide.

**11.** A method for stabilizing polypropylene prepared by polymerization over a metallocene catalyst or a polypropylene copolymer prepared by polymerization over a metallocene catalyst, which comprises incorporating into the polypropylene or polypropylene copolymer a stabilizer mixture as defined in claim 1.

**12.** A method for stabilizing polypropylene prepared by polymerization over a metallocene catalyst or a polypropylene copolymer prepared by polymerization over a metallocene catalyst, which comprises incorporating into the polypropylene or polypropylene copolymer a stabilizer mixture as defined in claim 6.

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